ViaLiteHD
SATCOM6
Outdoor enclosure

User Manual

HEA-xx-HB-1

CR3187   14/05/14 C E

Instrument Care and Safety Information

*Please read the whole of this section before using your **ViaLiteHD** product. It contains important safety information and will enable you to get the most from your Fibre Optic link.*

Electrical Safety

The **ViaLiteHD** SATCOM6 enclosure provides the termination for power inputs and can be fitted with power supplies.

The **ViaLiteHD** SATCOM6 enclosure is a Safety Class 1 product (having metal chassis directly connected to earth via the power supply cable).

When operating the equipment note the following precautions:

- Hazardous voltages exist within the equipment.
- The enclosure earth stud SHOULD be connected to the safety earth.
- When using a 2 pin power supply cable the enclosure earth stud MUST be connected to the safety earth.
- PSU modules are fused on the mains live feed only. A second fuse should be used for the neutral connection where the polarity of the connectors can be reversed.

ESD Precautions

Precautions for handling electro-static sensitive devices should be observed when handling all **ViaLiteHD** modules. Technicians should ensure that they use effective personal grounding (i.e. ESD wrist strap etc.) when servicing the equipment. Any equipment or tools used should be grounded to prevent static charge build-up. Good practice should be observed at all times. For reference see relevant standards. EN 61340-5-1, "Protection of Electronic Devices from Electrostatic Phenomena – General Requirements"

Optical Safety

The **ViaLiteHD** SATCOM6 enclosure may be fitted with optical units

The **ViaLiteHD** RF Transmitter and Transceiver modules contain laser diode sources operating at nominal wavelengths of 1270nm to 1610nm.

These devices are rated as EN60825-1:2007 CLASS 1 radiation emitting devices. A class 1 laser is safe under all conditions of normal use.

When operating the equipment note the following precautions:

- Never look into the end of an optical fibre directly or by reflection either with the naked eye or through an optical instrument.
- Never leave equipment with radiating bare fibres – always cap the connectors.
- Do not remove equipment external covers when operating.

Hot surface

When operated under full load and elevated temperature the SATCOM6 enclosure can become hot.

Suitable precaution should be taken when handling this device.
- Allow to cool for 10 minutes
- Do not touch metallic surfaces or printed circuit board when hot.

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1   Initial Inspection

Unpack and inspect the equipment as soon as possible. If there is any sign of damage or any parts missing, do not install the equipment before seeking advice from PPM or your local agent.

The equipment received should match the delivery note that is shipped with the equipment. Contact PPM or your local agent in case of any discrepancies.

2   Introduction to the *ViaLiteHD* Range

The **ViaLiteHD** range has been developed to provide a modular solution to the transmission of a wide range of analogue and digital data where traditional 'copper wire' systems cannot be used, for example, in electrically noisy environments or over long distances.

The range is ideal for permanent and semi-permanent installation in Satellite communications, GPS, antenna remoting and other related applications.

The variety of links available includes low frequency timing (2kHz) to wideband RF (4.2GHz), RF splitters, Oscillators, Amplifiers and Protection switches; they also include a full suite of supporting functions including RS232/422/485, Ethernet (to 1000 BT) and control systems to monitor and control the system with both Web and SNMP interfaces.

All **ViaLiteHD** equipment operates over high quality glass fibre optic cable, which can be supplied in low-cost 3mm jacket, riser and outdoor specifications. The links can also be used with existing cable systems at customer premises.

A **ViaLiteHD** system can be added to at any time, enabling the system to evolve with the needs of the user.

3   *SATCOM6* **System Description**

The SATCOM6 is a stainless steel, weatherproof enclosure designed specifically to be mounted near or on the antenna at teleports and ground stations. The enclosure accepts up to six *ViaLiteHD* modules including all RF, digital and ancillary modules. The enclosure can be fitted with dual power supplies, switch and splitter modules to enable full redundancy. The electrical and optical interfaces are highly configurable. There is also rear space in the cabinet for ancillary components such as a multi-way splitter, duplexer, high power bias-tees, fibre dressing and a fibre splice tray. The motherboard offers optional LNA/LNB power routing as well as 13/18/22V and 22kHz tone.

Key features:

- Wall or pole mount
- Dual power supplies
- Integrated SNMP for remote monitor and control
- LNB powering
- Built in Ethernet switch (option with SNMP card)

The mainboard accepts up to six *ViaLiteHD* modules. Additionally two LNB units can be populated to the rear side of the motherboard. Standard RX/TX *ViaLiteHD* modules units can be placed in any of the six slots, some ancillary *ViaLiteHD* modules offer full functionality only if placed in particular slots.

Table 1 Motherboard slots population matrix

Slot number	1	2	3	4	5	6	7	8	9	10	11
Connector reference	J12	J13	J14	J15	J16	J17	J18	J19	J25	J7	J8
Module Type											
RF standard	x	x	x	x	x	x					
RF + digital			x			x					
RF - High power	x	x	x	x	x	x					
Amplifier	x	x	x	x	x	x					
Splitter		x			x						
Switch		x			x						
Serial Digital			x			x						
Ethernet	x	x	x	x	x	x					
PSU - LNB (13/18V)							x	x			
SNMP									x		
Summary Alarm									x		
PSU main (12V)										x	
PSU reserve (12V)											x
PSU LNA (3.3-48V)											x

Power switches

PSUs

Optional sunshield

Fans

**Mounting hinges**

SNMP card
craft port

Optical adapters

Backplane

LNBs
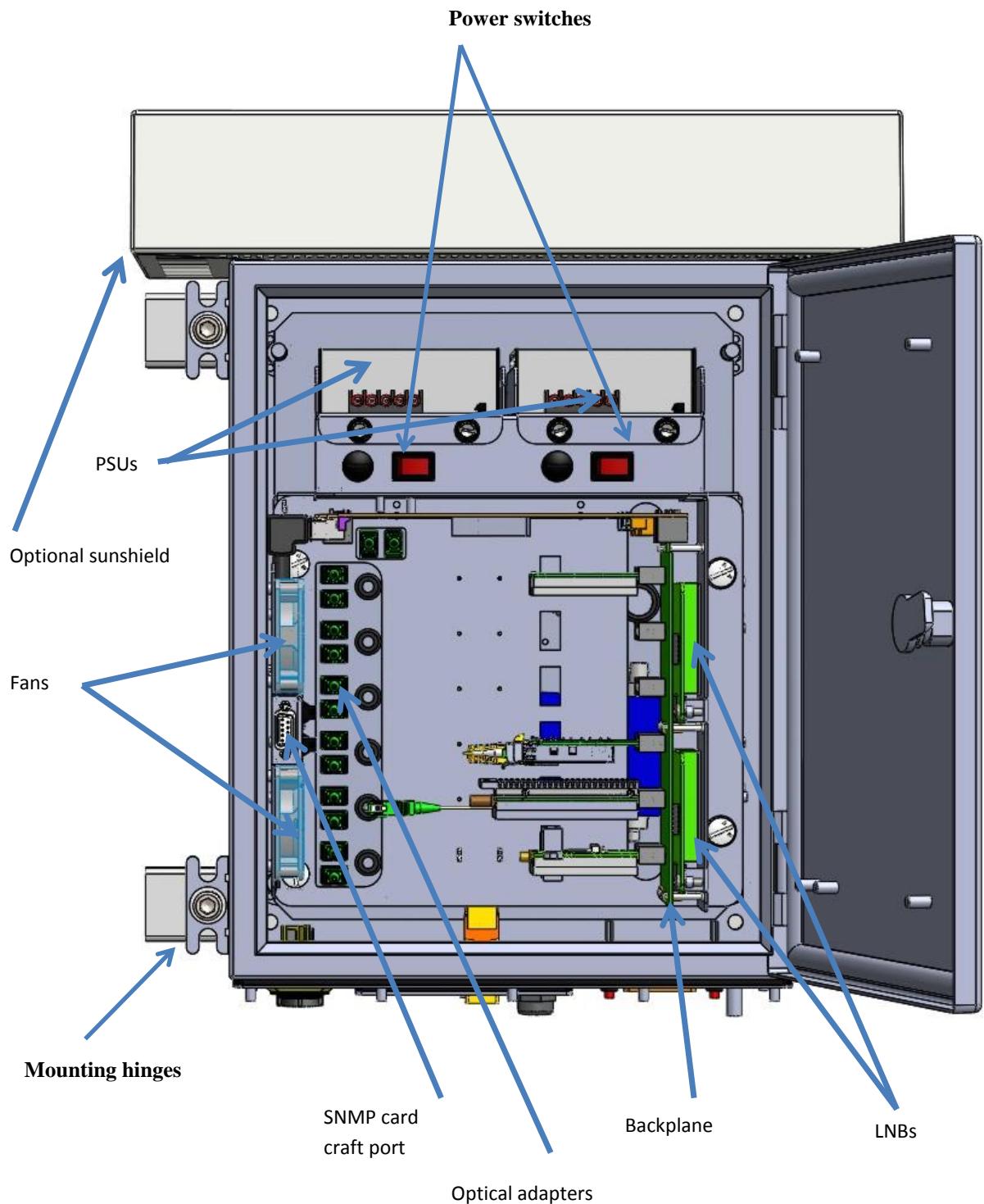
Figure 1 SATCOM6 enclosure

3.1   Backplane connections

Your cabinet should be delivered fully configured as per your order, and ready to operate. The details of the default backplane configuration will be contained in your order specific handbook that your SATCOM6 is delivered with.

Figure 2 Location of switch and jumpers on the backplane

Note that J18 and J19 are located on the other side of the board
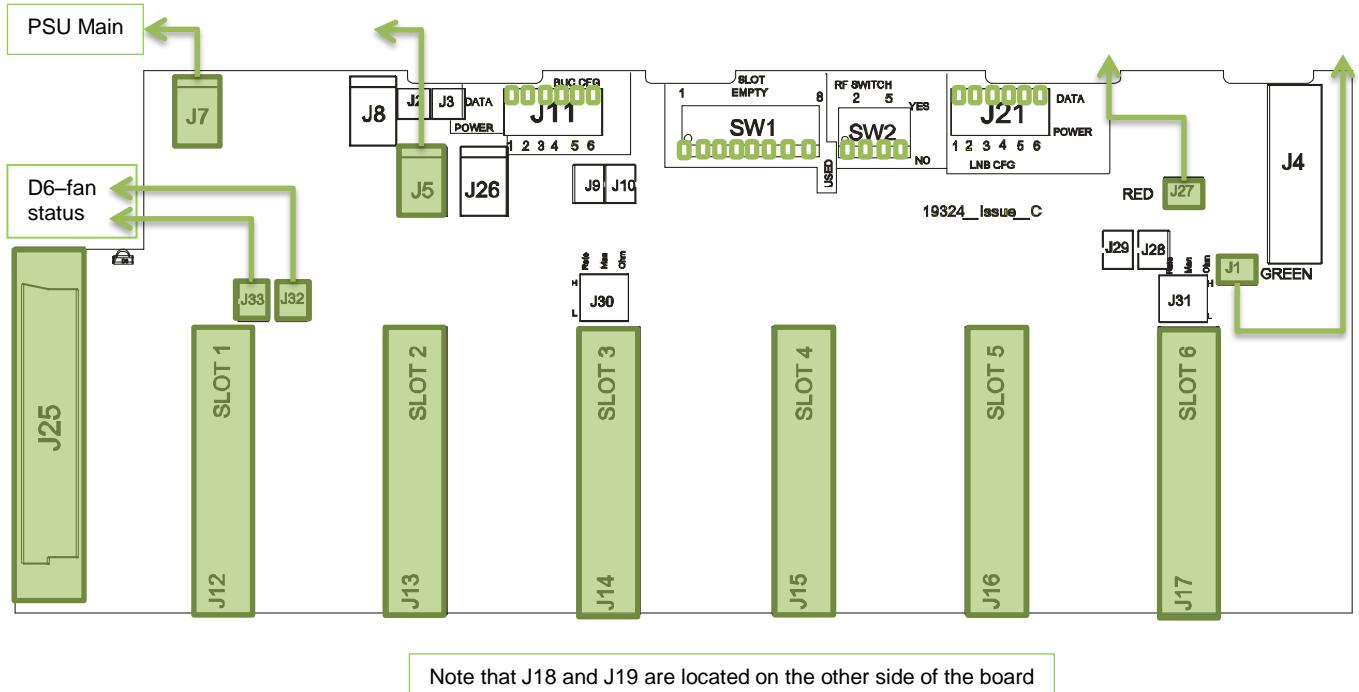
Table 2 List of jumpers and switches on the backplane

| Switch/ jumper	Function description	Configuration example	Configuration example description
J11	'POWER' (jumper down) connects the output of the LNB to the BUC FEED pin of the fibre optic receiver, 'DATA' (jumper up) allows using serial interface.		• Serial digital card used in SLOT3 • LNB2 supplied to pin 1 (BUC feed) of SLOT6
J21	'POWER' (jumper down) connects the output of the LNB to the LNB FEED pin of the fibre optic transmitter, 'DATA' (jumper up) allows using serial interface.		• Serial digital card used in SLOT6 • LNB1 supplied to pin 1 (LNB feed) of SLOT2
J30	Used to specially configure the serial digital module in SLOT 3 (refer to the relevant handbook for more details).		If used this would normally be connected to special interface cable.
J31	Used to specially configure the serial digital module in SLOT 6 (refer to the relevant handbook for more details).		If used this would normally be connected to special interface cable.
J2	Connects the output of LNB1 (SLOT7) to the external voltage feed (J5 & J26). J2 is highlighted in red.	 J2 is the 4 pin connector next to J8	• LNB1 connected to J5 & J26 These jumpers are electrically in parallel, both should be fitted.
J3	Connects the output of LNB2 (SLOT8) to the external voltage feed (J5 & J26). J3 is highlighted in red.		• LNB2 connected to J5 & J26 These jumpers are electrically in parallel, both should be fitted.
SW1	'EMPTY 'position masks the alarms from unused modules. 'USED' should be set if the slot is occupied.		• Slots 1, 2 and 4 set as empty • Slots 3, 5, 6, 7 and 8 set as used Alarm lines from slots 1, 2 and 4 will be ignored.
SW2	Connects the alarm lines from adjacent slots to the RF switch. 'YES' if RF switch is populated in the slot, 'NO' otherwise.		• SLOT2 used for the switch • SLOT5 used for different purpose

3.2 Glandplate connections

Figure 3 SATCOM6 enclosure - bottom view
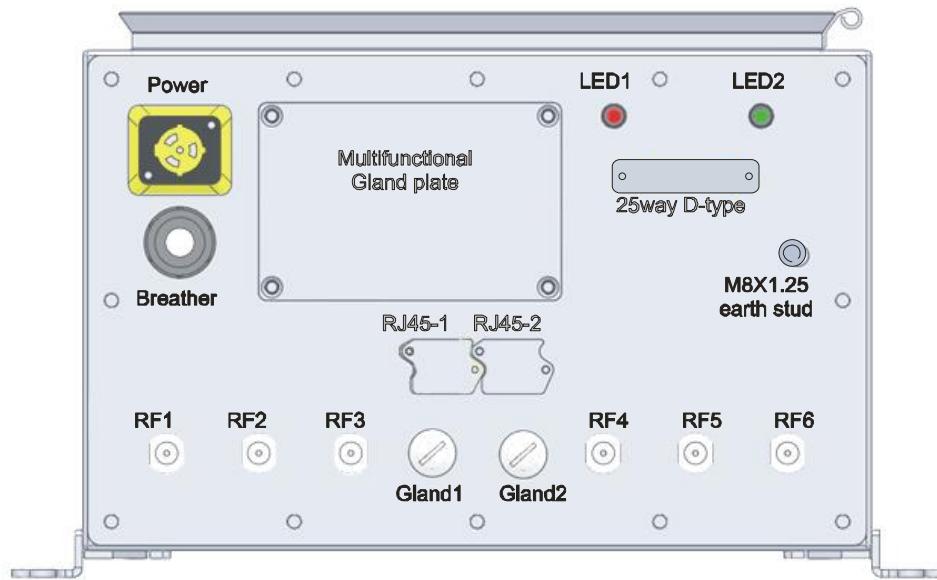
Any used connections will be environmentally sealed.

3.3 External interface connectors and fuses

RF connector: N-Type female, impedance to match your RF modules
Power connector:*   Circular plug [Neutrik Powercon True1]
Gland: M16 Gland accommodate wire diameters 2 to 7mm [Lapp Kabel 53112110]

* Mating half supplied (unwired) if connector is fitted

4   Enclosure installation

The SATCOM6 enclosure has been designed to work in harsh environments. The maximum ambient temperature for the enclosure is +55°C. When installing the enclosure pay attention to the following:

1. Leave open space around the enclosure to allow air circulation (minimum gap of 15cm is recommended).
2. Avoid installation in places with direct exposure to the sunshine very sunny places. Consider using the optional sunshield if the unit will be in direct sunlight. Please contact PPM for assistance to identify the correct part if you want to use a sunshield.
3. In the event that both internal cooling fans fail, the maximum ambient temperature that the SATCOM6 can operate in will be reduced by 10°C, to +45°C.

4.1   Cold weather option

The SATCOM6 can operate down to -10°C without a heater. If lower temperature operation is required contact PPM, there are several heater options available for the SATCOM6.

5   System configuration

5.1   Slots configuration

Your SATCOM6 should be delivered preconfigured to your order instructions. To check the configuration or in case reconfiguration is needed please follow the procedure below.

1. Check if the module is suitable to be used in the slot according to the pin outs it has (see table 1 in section 3).
2. Using jumpers J11 and J21 configure pins 1 and 9 of the slot. Setting the jumper to 'POWER' connects the relevant pin to the output of the LNB card. Setting to 'DATA' activates serial data interface (for serial digital modules in slots 3 or 6). If using LNB power generated from SATCOM6 LNB power cards then slots 1, 2 and 3 are powered by LNB 1 (slot 7), and slots 4, 5 and 6 are powered by LNB 2 (slot 8).
3. If an RF switch card is fitted to a slot check SW2 is in 'YES' position, otherwise place it in the 'NO' position.
4. Serial digital cards can only be used in slots 3 and 6. They can be configured via SNMP or manually. To set parameters manually use jumpers J30/J31. Refer to the **ViaLiteHD** RF Support Module handbook for more information about configurable parameters.
5. Check the position of jumpers J2/J3. If jumpers are closed the external LNB is connected.
6. For all populated slots set SW1 switch to 'USED' position. If a slot is left empty set the SW1 switch to the 'EMPTY' position.

Refer to section 3.1 for detailed description of all jumpers and switches on the motherboard.

The pin-out of the slots can be found in the tables below.

Table 3 Slots 1 and 4 pin-outs

Pin number	Pin description
1	BUC FEED (configurable via J11)
2	NC
3	NC
4	GND
5	VCC
6	NC
7	NC
8	NC
9	LNB FEED (configurable via J21)
10	NC
11	NC
12	ALARM
13	NC
14	SCL
15	SDA

Table 4 Slots 2 and 5 pin-outs

Pin number	Pin description
1	BUC FEED (configurable via J11)
2	NC
3	NC
4	GND
5	VCC
6	NC
7	NC
8	NC
9	LNB FEED (configurable via J21)
10	ALARM LEFT (switchable via SW2)
11	NC
12	ALARM
13	ALARM RIGHT (switchable via SW2)
14	SCL
15	SDA

Table 5 Slots 3 and 6 pin-outs

Pin number	Pin description
1	BUC FEED or TX422 IN+ (configurable via J11)
2	TX422 IN-
3	TX232 IN
4	GND
5	VCC
6	RX422 OUT+
7	RX422 OUT-
8	RX232 OUT
9	LNB FEED or RTS (configurable via J21)
10	Serial CFG1
11	Serial CFG2
12	ALARM
13	Serial CFG3
14	SCL
15	SDA

5.2   Summary alarm configuration

The SATCOM6 enclosure is equipped with the summary alarm indication by mean of two external LEDs. Green indicates normal operation, red indicates an alarm condition in one or more of the slots. No light indicates a power failure. Alarm circuitry open drain type, requiring each unit to actively pull down to indicate normal mode of operation. In such circuit topology an empty slot would raise alarm. To prevent such a situation DIP switch SW1 should be set accordingly to the configuration, switch to 'USED' position if the slot is occupied 'EMPTY' if the slot is unoccupied. The switch allows masking of alarms from any of the 6 main slots or the 2 additional LNB slots.

5.3   SNMP card configuration

SATCOM6 can be monitored and controlled via a web browser or SNMP management system. Before first use the system has to be configured. Refer to HRC-1 handbook to find more details about the set-up process.

5.4   Fan operation

To allow reliable operation under harsh environmental conditions the SATCOM6 enclosure is equipped with two fans enabling internal air circulation. The speed of the fans is dependent on internal temperature. D6 LED indicates the status of the fans.

Table 6 Fan diode status

D6 LED state	Fan status
Off	Internal temperature below the limit, fans off
Blinking GREEN	Fans working between 40% and 100%
Solid GREEN	Fans working at 100%
RED	Fans' failure

5.5 External D25 connector

The external D25 connector provides access to serial interface if serial digital cards are installed in slot 3 or 6. Refer to the serial digital cards handbook for more information. Dry relay contacts to indicate alarms are also available.

Table 7 Normal Pin-out of the D25 connector, may differ for some special applications, see cabinet specific handbook

Pin	Pin description	Description	Pin	Pin description	Description
1	GND		14	RX 422 OUT- 6	RS422 interface – SLOT6
2	RX 422 OUT+ 3	RS422 interface – SLOT3	15	TX 232 IN 6	RS232 interface – SLOT6
3	TX 422 IN+ 3	RS422 interface – SLOT3	16	RX232 OUT 6	RS232 interface – SLOT6
4	RX 422 OUT- 3	RS422 interface – SLOT3	17	GND	
5	TX 422 IN- 3	RS422 interface – SLOT3	18	RTS 6	RTS – SLOT6
6	RX232 OUT 3	RS232 interface – SLOT3	19	RELAY 1	Dry relay contact (NO – normally open)
7	TX 232 IN 3	RS232 interface – SLOT3	20	GND	
8	RTS 3	RTS – SLOT3	21	RELAY 2	Dry relay (COM – common)
9	GND		22	VCC	
10	GND		23	RELAY 3	Dry relay contact (NC – normally closed)
11	TX 422 IN+ 6	RS422 interface – SLOT6	24	EXT V+	External power +
12	RX 422 OUT+ 6	RS422 interface – SLOT6	25	EXT V-	External power -
13	TX 422 IN- 6	RS422 interface – SLOT6			

NOTE: Relay contacts are available only if SNMP or SUMMARY ALARM card are fitted.
NOTE: Check jumpers J11 and J21 before connecting D25.

5.6 Using LNBs

5.6.1 Internal LNBs (up to two LNB power cards may be fitted to the SATCOM6)

1. Make sure that J2 and J3 jumpers are not populated.
2. Place the LNB unit in slot 7 or slot 8. Configure the LNB, for details refer to the LNB manual. The LNB card in slot 7 supplies voltage to slots 1-3, and the LNB card in slot 8 supplies voltage to slot 4-6.
3. Using jumpers J11 and J21 connect the LNB to the modules. Use J11 if an optical receiver is used or J21 for a transmitter. J11 in 'POWER' position connects the power from the LNB to the BUC FEED pin of the receiver. J21 connects the power from LNB to the LNB FEED pin of the transmitter.

5.6.2 External LNB, power routed via mother board

If an external power supply is used instead of LNB units follow this procedure:
1. Connect power to the J5 connector
2. By closing J2 jumper the power is routed to the output of the LNB1 internal module (slot 7). Closing J3 jumper routes the power to the output of the LNB 2 module (slot 8). Before closing one of the jumpers make sure that relevant slots are not populated.
3. Using jumpers J11 or J21 route the power to the appropriate slots – refer to 'Internal LNBs' section above for more details.

NOTE: Do not exceed voltage or current rating of modules, higher voltage can cause permanent damage. The voltage range of LNA/LNB feeds is 0 to +28V and for BUC feeds it is -36 to +36V. Please check the handbook specific to the module you are using.

5.6.3 External LNB/BUC, using

It is possible to provide a LNB/BUC power using separate bias Tee module fixed in the base of the SATCOM6. Wiring and other details of these bias Tees will be shown in the cabinet specific handbook.

5.7 Module Interface ratings

Where relevant please consult module handbooks for the individual modules you are using in each slot.

5.7.1 Logic interface, TTL 5V

Absolute maximum voltage rating	-0.5 to +5.5V	No damage
Input, Logic Low (max)	<0.8V	
Input, Logic High (min)	>2.0V	
Output, Logic Low (max)	<0.4V no load	
Output, Logic High (min)	>4.8V no load	
Drive capability	1k ohms	
Short circuit protection	No	

5.7.2   Logic interface, RS232

Absolute maximum voltage rating	-15 to +15V	No damage
Input, Logic Low (max)	<0.8V	
Input, Logic High (min)	>2.6V	
Output, Logic Low (max)	<-3.2V no load	
Output, Logic High (min)	>+3.2V no load	
Drive capability	3k ohms	
Short circuit protection	Yes	

5.7.3   Logic interface, RS422/485

Absolute maximum voltage rating	-12 to +12V	No damage
Input, Logic Low (max)	<0.8V	Common mode referenced to GND
Input, Logic High (min)	>2.0V	Common mode referenced to GND
Output, Logic Low (max)	<0.8V at 27 ohms	Common mode referenced to GND
Output, Logic High (min)	>2.0V at 27 ohms	Common mode referenced to GND
Output Differential	>1.5V at 27 ohms	
Output Differential	>2.0V at 50 ohms	
Drive capability	27 ohms	
Short circuit protection	Yes	

5.7.4   Logic interface, I2C

Absolute maximum voltage rating	-0.3 to +5.3V	No damage
Input, Logic Low (max)	<1.5V	
Input, Logic High (min)	>3.5V	
Output, Logic Low (max)	<0.6V no load	
Output, Logic High (min)	>4.3V no load	
Drive capability	1k ohms	
Short circuit protection	No	

5.7.5   Logic interface, Open Drain, output

Operational pull up voltage	0 to 15V	No damage
Maximum load current	50mA	
Short circuit protection	No	

Negative voltage on the output will be clamped by the FET body diode, you must ensure that these do not exceed current rating.

5.7.6   Power interface, +12V, input

Nominal input voltage	12V
Typical input voltage range	11 to 13V
Maximum operational voltage range	9 to 16V

5.7.7   Relay contacts

Contacts type	Form C break before make, dry contact, volt free
Maximum voltage & current	50V @1A, all voltages are relative to ground
Initial contact resistance	75 mΩ

6 Additional auxiliary modules

The space for auxiliary modules is provided under the metal work holding the motherboard. The wide range of passive units includes diplexers, RF splitters, bias Tees. Fibre components including fibre splice trays, CWDM filters and optical splitters can also be installed in this area.

Contact PPM or your local representative for more information.

7 SATCOM6 specification

SATCOM6 *ViaLiteHD* Outdoor Enclosure	
Number of RF links	1 to 6
IP Rating	IP66
External Dimensions (H:W:D)	380mm : 300mm : 210mm
Weight (without modules)	Approx. 15kg
Material	304 stainless steel
Interface	
RF Input / Output Connectors	N-type (50Ω or 75Ω) type Female
Optical Fibre Connections	Up to 2, Optical cable to fit M16 gland (2-7mm diameter) or Fastline cross site cable
Power Supply Connections	Neutrik Powercon True1
Electrical Specifications	
Supply Voltage Options	AC: 88-264v, DC: 15, 24 or 48v
LNB powering options	On board 12/18/24v + 22kHz (manual and SNMP switchable)
BUC Supply Voltage Options	Optional, BUC bias T internal or external input (+24v, -48v, +48v), external 5A plug
Alarm Indications	
Indicator Type	External LED
Channels Monitored	PSU voltage rail, digital module alarms, analogue monitors
SNMP monitor and control	Optional
Environmental Specifications	
Operating Temperature Range	-10°C to +55°C without heater, -20°C to +55°C with single DC heater -30°C to +55°C with dual DC heaters -40°C to +55°C with AC heater
Storage Temperature Range	-40°C to +70°C
Climate Control	Humidity ventilator, heater (optional), sunshield (optional)